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Abstract

This study uses data from the German Socio-Economic Panel to analyze peer effects in risk preferences. Empirical evidence on the impact of peer groups on individual willingness to take risks ("peer effects") is very limited so far as causality is hard to establish. To establish a causal relationship between individual and community risk preferences, we use an instrumental variable approach where we track the impact of the East-West migration after the German reunification. We find strong support for peer effects in risk preferences. Peer effects seem to be particularly driven by female community members. Our findings shed light on the origin and stability of risk tolerance and, more generally, on the determinants of economic preferences.

Keywords: peer effects, willingness to take risks, risk preferences, instrumental variable, German SOEP, migration.

JEL classification: C12, D12, D81.

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1 Motivation

Ever since the prominent work by Arrow (1971) as well as Friedman and Savage (1948), it is well-known that individuals´ risk preferences have a significant impact on their decision-making under risk. Individuals´ attitudes towards risk are especially important when it comes to financial decisions, such as insurance and investment choices.[1] Based on Bernoulli's assumptions and utility theory, most studies analyze decision-making under risk on the individual level. However, peers may play a role leading to a deviation from individual decision-making. The existence of peer effects is very well documented in the literature (see, e.g., Sacerdote, 2001), and peer effects supposedly exist in different group settings, such as work places, schools and universities as well as in local communities. Our peers shape our financial investments (see, e.g., Brown et al., 2008), our work productivity (see, e.g., Falk and Ichino, 2006), and our retirement decisions (see, e.g., Duflo and Saez, 2002), just to name a few. All these economic decisions have one thing in common: They are all decisions under risk and uncertainty even though previous studies have rather focused on observing actual outcomes than potential underlying changes in risk preferences. Accordingly, it is still unclear whether peer effects in the area of decision-making under risk operate at the outcome level or by modifying the underlying risk preferences or both. Understanding how our peers impact our decisions under risk and uncertainty is a crucial factor to better understanding economic decision-making.

To the best of the authors' knowledge, there are two studies investigating peer effects and risk preferences in experimental settings: Ahern et al. (2014) and Balsa et al. (2015) are the first to find evidence for risk aversion being driven by peer interaction in small scale field studies. We contribute to this literature by investigating the effect of peer groups on individual risk attitude empirically within a representative sample of the German population from the German Socio-Economic Panel (SOEP) study, while Ahern et al. (2014) focus on MBA students and Balsa et al. (2015) investigate high school students. In contrast to the referenced papers above, we study peer effects in risk preferences in local communities rather than in academic settings. In addition, we utilize a measure of risk preferences that has been shown to have better stability over time and higher predictive validity (see, e.g., Mata et al., 2018). We are able to establish a causal relation-

[1] See, for instance, Markowitz (1952), Mossin (1968) and Cohen and Einav (2007). Individuals' risk attitudes are not constant, but can be affected by various exogenous factors (see, e.g., Browne et al., 2015; 2017). Recent research has focused on factors changing risk attitudes of individuals, such as macroeconomic conditions and major life events (see, e.g., Hoffmann et al., 2013; Browne et al., 2017).

ship between individual and community risk preferences by showing that an individual adapts to peers´ risk attitude. Following Brown et al. (2008), we rule out other factors than peer effects, such as same preferences or common reaction to public information, that could lead to a spurious correlation between one´s own risk attitude and that of one´s neighbors. Since individuals are not randomly assigned to communities, the observed correlation between an individual´s risk attitude and her community could reflect a variety of unobservable influences that induce a spurious correlation even after controlling for observable characteristics. Unobserved characteristics thus could drive both individual and community behavior. Therefore, we use an instrumental variable approach and restrict our sample to native residents in former West Germany in order to ensure that the results are not contaminated by an individual and her community members sharing the same background (see Brown et al., 2008).[2] We identify peer effects based on the influence of East-West migration on West German communities after the fall of the Berlin wall in 1989. Since we restrict our sample of western community to natives, risk attitude in East and West Germany are unlikely to be correlated with each other prior to the German reunification except through peer effects between the native westerners and the new community members from the East. This way we are able to track how changes in risk preferences in the place of origin of the movers impact their local western communities. We benefit from the unique historical setting with the German division and its later reunification that offers a natural split.[3]

This study contributes to prior literature by providing empirical insights into the consequences of social interaction on individual risk preferences using a large panel survey dataset. Following the research body on peer effects, we expect that individuals´ risk attitude changes when an interaction with potential peers takes place, which may lead to a deviation from original risk preferences. This study confirms that a change in overall willingness to take risks in a region changes the willingness to take risks of the West German native residents in this region. This seems to be particularly driven by the female inhabitants of the regions. We do not find conclusive evidence for stronger peer effects for more sociable individuals even though this seems intuitive.

[2] We restrict our analysis to native individuals residing in the same federal state in West Germany at least one year prior to and after the fall of the Berlin wall. Thus, native individuals have lived in the same western community over the entire panel.

[3] From the erection of the Berlin wall in 1961 until the fall of the Berlin wall in 1989, Germany was divided into the Federal Republic of Germany (FRG) and the German Democratic Republic (GDP). Before the fall of the Berlin wall, GDR citizens were usually not allowed to migrate to West Germany.

After the introduction, this article is structured as follows: The next section reviews related literature on the formation of risk attitude, factors associated with changes in risk attitudes, and peer effects; the section also develops general hypotheses resulting from the review. Section 3 introduces the dataset which is suitable for answering the raised research questions and the variables of interest. Our empirical strategy is presented in Section 4. In Section 5, we summarize our empirical results. Section 6 concludes.

2 Related Literature and Hypothesis Development

While almost all economic models assume that individuals only care about their own well-being, there is ample evidence that people also care about others (e.g., Rabin, 1993; Fehr and Schmidt, 1999; Trautmann, 2009). Peer effects occur if the decision maker chooses not to stay with her individual choice (Lahno and Serra-Garcia, 2015). Fairness motives do influence the behavior of many individuals (Fehr and Schmidt, 1999) so that decision-making under risk should not only be studied at the individual level but rather incorporate others´ decisions and economic attitudes (see, for instance, Ahern et al., 2014). Recent studies focus on individuals´ internal motivation for adapting their behavior to peers, comparing distributional social preferences and social norm-based preferences. Manski (2000), for instance, states that, in an environment with complete information, preference interaction may arise from 'everyday ideas' such as envy (i.e., individuals care about others´ outcomes) and conformity (i.e., individuals care about others´ choices). Studies in social psychology show that individuals' decisions may be driven by social norms (e.g., Cialdini and Trost, 1998; Cialdini and Goldstein, 2004) rather than rational expected utility maximization, which supports Festinger´s (1954) idea of a social anchor to which individuals usually conform. However, less attention has been given to preferences where peers´ choices have a direct impact on individual behavior. Instead, envy is seen as a central concept in models of distributional social preferences, such as Fehr and Schmidt´s (1999) model of inequity aversion. Viscusi et al.'s (2011) experimental results show that simply observing group investment decisions affects individual decision-making, which leads to a shift away from individual choices in isolation. Lahno and Serra-Garcia (2015) investigate the drivers of peer effects by distinguishing between the two sources envy and conformity. The authors show in an experimental setting that peer effects in risk preferences can be explained by both relative payoff concerns and a preference to conform to others. Peer choices thus are important in generating peer effects and hence

have important policy implications. While the above-mentioned studies investigate the drivers of peer effects in risk preferences, relatively little is known about the underlying reason for adaptation of behavior. Do peers influence individuals´ behavior, their perception of alternatives and social norms, their risk perception, or their risk tolerance? This paper concentrates on the latter by investigating whether peers do (also) influence the underlying risk attitude of individuals.

A growing literature has been focusing on trying to establish causal peer effects when it comes to decision situations. The literature on how peers may impact individuals' decision-making processes stems from diverse disciplines, not only economics and psychology. To summarize, peers are known to have an impact on stock market participation (e.g., Brown et al., 2008; Shiller, 1984; Hong et al., 2004), investment decisions such as pension plans, savings, and credits (e.g., Banerjee et al., 2013; Bursztyn et al., 2014; Georgarakos et al., 2014; Duflo and Saez, 2002; Heimer, 2014), as well as insurance choices (Cai et al., 2015). For instance, Cai et al. (2015) find that social networks have an impact on the adoption of a new weather insurance product and that this network effect is driven by the diffusion of insurance knowledge rather than purchase decisions. Furthermore, there exist peer effects in education (e.g., Sacerdote, 2001; Zimmerman, 2003) and labor market participation (e.g., Card et al, 2012) as well as in health (e.g., Trogdon et al., 2008). We explore a different channel for peer effects by focusing on economic attitudes rather than on behavioral outcomes.

Using experimental approaches, Ahern et al. (2014) and Balsa et al. (2015) find evidence for risk aversion being driven by peer interaction. Ahern et al. (2014) state that peers might generally influence individual risk preferences in a repeated survey on MBA students who were randomly assigned to project groups. They attribute these positive peer effects to a desire for conformity. In contrast, Balsa et al. (2015) estimate peer effects in risk attitudes in a sample of high school students using lottery choices. We test whether we can also observe the existence of peer effects in risk preferences in local communities of grown individuals. Given that peer effects seem to build on the diffusion of information, opinions and knowledge in a community, we posit the following hypothesis:

Hypothesis 1: Peer groups affect individual willingness to take risks, ceteris paribus.

Following Brown et al. (2008), we aim to investigate the role of sociability on the impact of peer effects on risk preferences. It seems intuitive that individuals with higher levels of peer interac-

tion have greater peer impacts than individuals with less social interaction. This idea follows Scherer and Cho (2003) who find that social linkages in a community play an important role in the formation of individuals' risk perceptions. Individuals with higher levels of peer interaction, ceteris paribus, are thus predicted to have greater peer impacts when compared to individuals with less interaction. Therefore, we posit the following hypothesis:

Hypothesis 2: Peer effects are stronger for more sociable individuals, ceteris paribus.

We then hypothesize about the magnitude of peer effects for male and female native individuals. Interestingly, as shown by Booth and Nolen (2012a), female individuals' risk preferences tend to differ significantly from those of men, and may even be more strongly affected by the gender structure of their peer group. This suggests that women may be more social, differ in their level of competitivenes when compared to men, and are thus overall more susceptible when it comes to risk preferences. Cárdenas et al. (2012) show that Swedish girls tend to be more competitive than boys in terms of performance change, while boys are more likely to choose to compete in general. However, this is not the case for Colombian children. Booth and Nolen (2012b) also do not find evidence for a difference of the level of competitiveness between men and women. Thus, observed gender differences in behavior under risk and uncertainty might reflect social learning rather than inherent gender traits (Booth and Nolen, 2012b). Furthermore, according to Charness and Gneezy (2012) and Cárdenas et al. (2012), females tend to be more risk averse than males. This could lead to females being more likely to ask for advice in the community.

In the studies on gender effects, we cannot distinguish a clear evidence whether men or women are more prone to peer effects in general, as the findings seem to be context dependent. With respect to academic outcomes, Hoxby (2000) and Lavy and Schlosser (2011) find that the presence of more females in school classrooms improves male and female learning outcomes equally. The exact mechanism of gender on peer effects is, however, hard to disentangle and gender effects have mostly been examined for children and adolescents. Duflo and Saez (2003) find that peer effects in retirement decisions are more dominant among the peer impact of the own's gender group. Only one study exists which investigates gender in peer effects for risk preferences: Balsa et al. (2015) find that male adolescents are more prone to peer effects with respect to risk aversion. As there is only one previous paper investigating the difference and there may be some conceptual differences how gender affects peer effects in risk preferences among grown adults, we

formulate the null hypothesis assuming no gender differences and test whether we will have to reject it:

Hypothesis 3: Peer groups have the same impact on female willingness to take risks and male willingness to take risks, ceteris paribus.

3 Data

We use the SOEP to test our hypotheses. The SOEP is a representative panel dataset of the resident adult population living in Germany. It is published by the German Institute for Economic Research in Berlin containing information on approximately 30,000 individuals living in about 11,000 households.[4] The survey has been conducted on a yearly basis since 1984. The sample has been extended in 1990 due to the German reunification including around 2,000 East German households. Each year between January and May, individuals are asked for a wide range of personal and household information, including financials, lifestyle, and health status, and for their attitudes on assorted topics, including political and social issues. Furthermore, the SOEP contains information on socio-demographic factors such as age, wealth, education, marital status as well as educational level and occupation. In addition, it records individuals´ self-reported willingness to take risks and tracks changes in residence. Data is provided on the federal state level. For our analysis, we use the 2004, 2006 and 2008-2015 waves of the SOEP that include information on the self-assessed willingness to take risks. Our dataset consists of 2,226 individuals older than 18 (or turning 18 in the year they participate in the survey for the first time) and includes 17,980 person-year observations.

3.1 Willingness to take risks (WTR)

To elicit an individual´s risk attitude, the SOEP asks its respondents to self-assess their willingness to take risks (WTR) on a scale from 0 to 10, with 0 representing no tolerance for risks and 10 representing the highest willingness to be exposed to risks. The self-reported WTR was first included in 2004, was included again in 2006 and has been included yearly since 2008. Figure 1 shows the survey question for self-assessment of risk tolerance in the SOEP questionnaire.

[4] See Wagner et al. (2007) for more information on the SOEP.

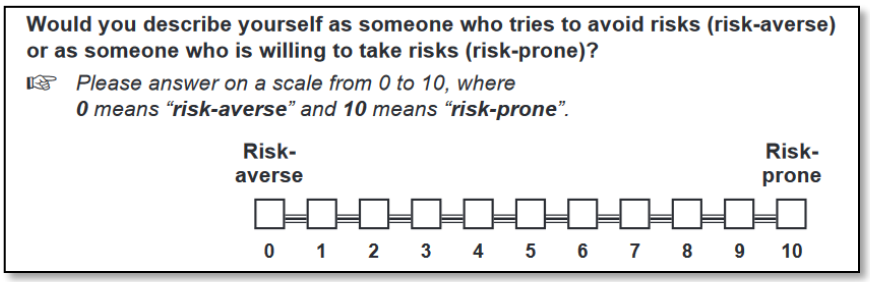

Figure 1: Self-assessed willingness to take risks on a scale from 0 (risk-averse) to 10 (risk-prone). *Source:* SOEP v32.1.

We use the individual risk tolerance level as dependent variable. Figure 2 illustrates the distribution of this variable lying between 0 and 10.

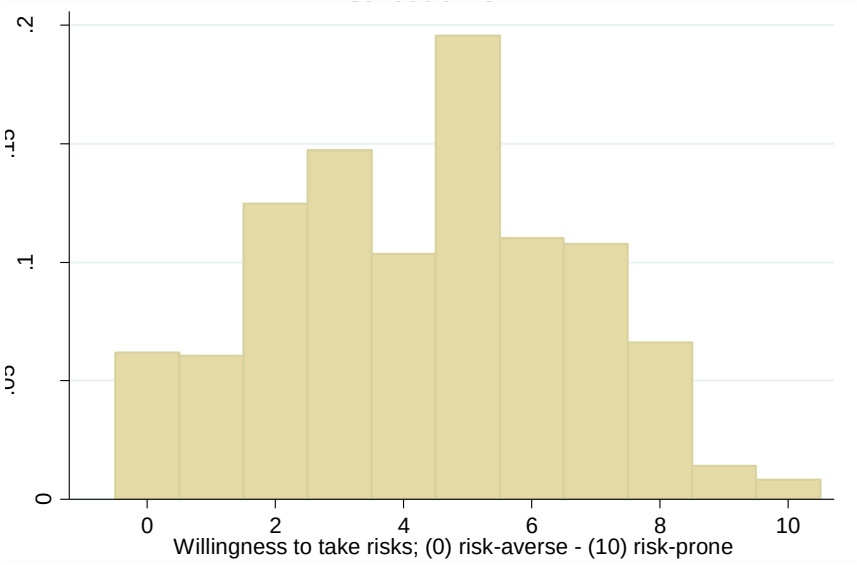

Figure 2: Distribution of the dependent variable willingness to take risks. "0" indicates no risk tolerance, "10" indicates fully ready to take risks. *Source:* SOEP v32.1, 2004-2015.

Figure 3 shows that the average willingness to take risks over years differs between federal states ranging from 4.0 to 5.0. On average, Rhineland-Palatinate is the most risk-averse federal state while people in Saarland seem to be the most risk-seeking ones.

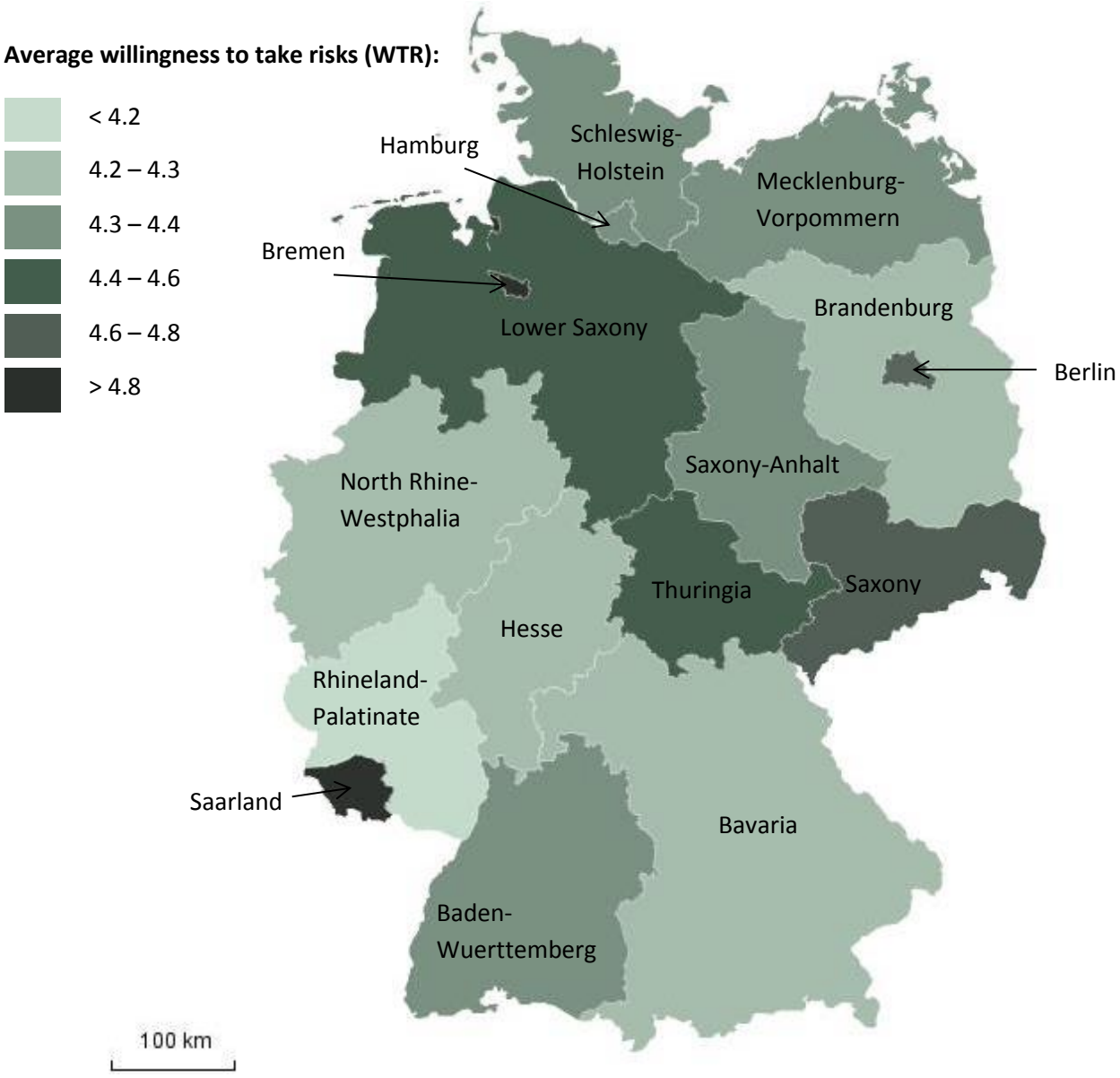

Figure 3: Average risk attitude per federal state over the years 2004, 2006 and 2008-2015. "0" indicates no risk tolerance, "10" indicates fully ready to take risks. *Source:* SOEP v32.1, 2004-2015.

Even though incentivized lottery choices are considered the method of choice to elicit risk preferences for many economists, the self-reported WTR has been shown to be a valid measure in large, longitudinal surveys by, for instance, Dohmen et al. (2011), Vieider at al. (2014) and Lönnqvist et al. (2015). Mata et al. (2018) find in a meta study that self-stated risk preferences outperform lab elicited preferences in terms of retest stability, convergent and predictive validity. As we investigate longitudinal data, relying on a measure with improved retest stability is a crucial factor for increasing the chance of significant results.

3.2 Sociability

As we expect peer effects to be stronger for more sociable individuals, we identify variables that reveal how social people are and how regularly they are in touch with others. For our purpose, we define a sociability index that indicates whether individuals tend to ask their community or neighbors for advice when making a decision under risk or uncertainty. Following Hong et al. (2004) and Brown et al. (2008), that show that individuals who visit with neighbors or attend church have higher levels of stock market participation, and that this effect is stronger for individuals who live in more sociable regions, we investigate whether peer effects are stronger for residents interacting socially with others. As argued above, social people can be expected to more likely adapt to neighbors´ risk attitude. The SOEP provides information on the variables *attend church or other religious events*, *attend cultural events*, *perform volunteer work*, *participate in local politics*, *attend cinema, pop and jazz concerts*, *hours spent on hobbies in leisure time (on weekdays)* and *visit neighbors and friends*. We form three categories each – never (0), less frequently (1), and every week (2) – and add up these values to construct our sociability variable. For variables that are not defined for all years, we interpolate the interim, missing values by using the values for the years given or derive values by forming the mean of the years before and after.[5]

Figure 4 shows the distribution of the sociability variable.

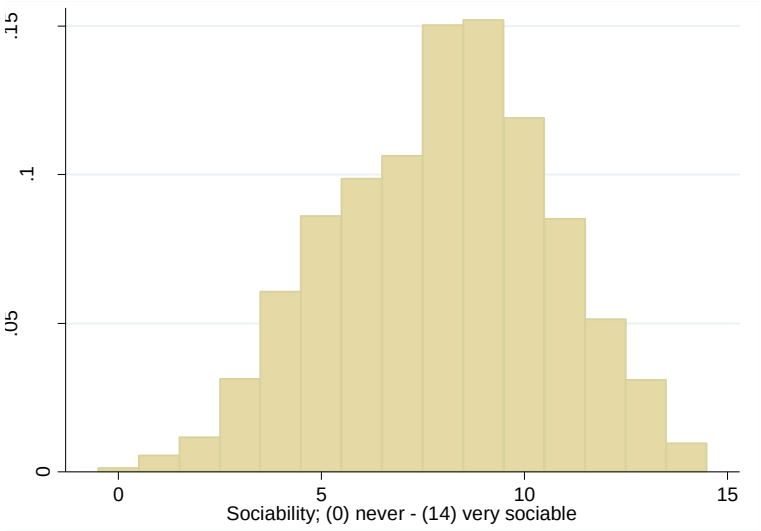

Figure 4: Distribution of the variable sociability. "0" indicates an individual not being sociable at all, "10" indicates a very sociable individual. *Source:* SOEP v32.1, 2004-2015.

[5] Due to interpolation, decimal numbers are also allowed. For reliability analysis, Cronbach's alpha was calculated to assess the internal consistency of the subscale for sociability, which consists of seven SOEP questions. According to Field (2009), the internal consistency lies within an acceptable range, with Cronbach's alpha for sociability of 0.511.

3.3 Definition of natives and movers

We differentiate between inhabitants from states of former West Germany (i.e., Baden-Wuerttemberg, Bavaria, Bremen, Hamburg, Hesse, Lower Saxony, North Rhine-Westphalia, Rhineland-Palatinate, Saarland, Schleswig-Holstein) and those of former East Germany (i.e., the newly-formed German states Brandenburg, Mecklenburg-Vorpommern, Saxony, Saxony-Anhalt and Thuringia) to make our approach robust.[6] Following Hunt (2006), Berlin is excluded from our sample due to its division in East and West Berlin before the fall of the Berlin wall. The Berlin wall physically and ideologically divided Berlin from 1961 to 1989 and thus a differentiation between former East and West Germans regarding this particular federal state is impossible.

The definition of a community and the resulting differentiation between movers and non-movers ("natives") are crucial for our analysis. We define 'movers' as individuals moving from one federal state to another and 'natives' as individuals that have lived in the same western federal state over the entire observation period from 1989 through 2015. The term 'incoming movers' refers to those individuals that have lived in former East Germany for at least five years and then moved to West Germany afterwards.

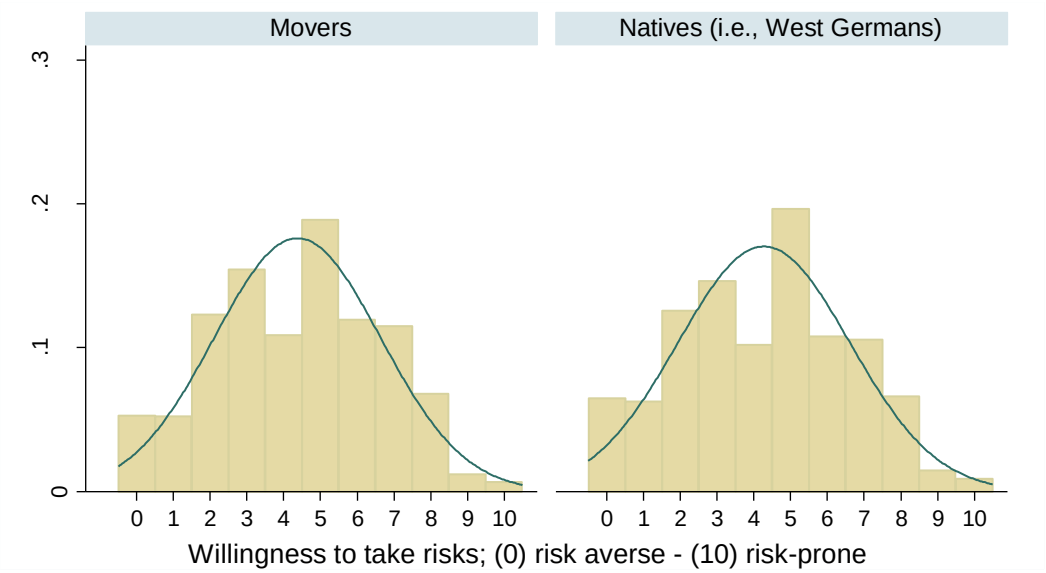

Figure 5: Willingness to take risks for natives (West Germans) and movers (including former East Germans and West Germans moving to another western federal state), 2006 and 2008-2015. The black curve shows the normal distribution. *Source:* SOEP v32.1, 2004-2015.

[6] See Section 4. The fall of the Berlin wall paved the way for German reunification, which formally took place on October 3, 1990. Note that we refer to former western or eastern federal states as western or eastern federal states throughout this article.

We expect risk attitude to be relevant for the choice to move or to stay in a particular federal state. Figure 5 shows how natives and movers differ when it comes to the average WTR over all observed years. The correlation between being a native resident in former West Germany and willingness to take risks is significant but only slightly negative with -1.7%. In contrast to Jaeger et al. (2010), we find no clear evidence for higher WTR and migration being associated as the relationships does not explain very much. This may stem from the rich dataset that is used.[7]

In the following, we want to make clear how the variables of interest are defined including information presented in this section. While our sample is restricted to natives, the average willingness to take risks in a community is constructed by adding up all inhabitants' willingness to take risks in a particular federal state, including former East Germans' risk attitude (i.e., incoming movers). The instrument is the average willingness to take risks of incoming movers' former eastern federal states one-year lagged, which will be presented in detail in the next section.

4 Empirical Strategy

We analyze peer effects by investigating the impact of a community's risk attitude on the individual residing in this community. Individuals, however, are not randomly assigned to communities. Thus, the observed correlation between individual and community risk attitude could reflect unobservable influences (e.g., a common reaction to public information) that induce a spurious correlation. Furthermore, a main challenge to adequately capture peer effects is to separate geographic clustering from peer effects. Reverse causality has to be ruled out so that people do not move as they want to live close to people with similar risk attitudes (i.e., geographic clustering) but rather adapt their risk attitude when moving from one area with different level of risk attitude to another (i.e., peer effects). Our instrumental variable approach overcomes this potential endogeneity problem.

Our empirical strategy loosely follows Brown et al. (2008), who use an instrumental variable approach to analyze the impact of peer effects in investment decisions. The authors suggest that the stock market participation of one's birth region can have long-lasting effects on one's own financial decisions regarding the stock market. They instrument for the average ownership within each native individual's community with the average ownership of the birth states of non-native

[7] Jaeger et al. (2010) investigate the 2004 and 2006 waves of the SOEP.

neighbors.[8] Our focus is on the German population, exploiting the relocation of many former GDR citizens after the fall of the Berlin wall in 1989. As briefly mentioned in the introduction, we consider whether individuals living in a West German federal state since 1989 (before and after the German reunification) adapt their willingness to take risks to their community´s risk attitude by allowing for East-West migration. Former East Germans moving in this western region thereby allow us to define an instrumental variable that is not correlated with native residents' willingness to take risks.[9] Since we cannot observe birth states in our sample, we utilize the former separation into East and West Germany and denote East German federal states in which a person lived at least five years before moving to West Germany as origin state.[10] We track the East German states in which the GDR migrants lived in and calculate weighted averages for each western community depending on where eastern migrants came from.

Social interaction plays a major part in decision-making under risk. Following Brown et al. (2008) and Hong et al. (2004), social interaction takes place among people located close to each other.[11] For our purpose, we use SOEP data on the state level. The data on federal states is representative of the entire German population within almost all areas (Knies and Spiess, 2007).[12] The data contains only a small number of observations regarding postal or county code analysis due to few people moving from one region to another.[13] Summing up the discussion above, we fit the following instrumental variable estimation approach.

[8] The authors use changes in financial decision-making in the birth states of new community members on the financial decision-making of native community members as instrument for financial decision-making in the community.

[9] Before the fall of the Berlin Wall, GDR citizens were usually not allowed to migrate to West Germany easily. Even though every citizen had the right to apply for a permit to leave the GDR, applying for such permit usually triggered severe political repercussions from close observance from the *Staatssicherheit*, the national intelligence agency, to job loss, denial of higher education for the whole family to several years in jail. Despite this, around 250,000 GDR citizens migrated to West Germany between 1961 (erection of the Berlin wall) and 1989 (fall of the Berlin wall).

[10] Note that we drop information on 19 individuals that lived in two different East German federal states during this period.

[11] Banerjee et al. (2013) and Hong et al. (2004), for instance, state that social interaction may serve as a mechanism for information exchange by means of word-of mouth communication or "observational learning".

[12] It is noteworthy that a more detailed structural analysis would come with the challenge that for geographically smaller regional levels, the case numbers in the regions become too low to allow for statistically significant conclusions (Knies and Spiess, 2007). See https://www.diw.de/en/diw_02.c.222519.en/regional_data.html for more information.

[13] This may be due to Germans being less willing to move within Germany. Note that our instrumental variable is constructed by adding up all non-natives' (lagged) average WTR of former federal states for each region and dividing it by the number of incoming movers. However, there are many regions in the postal code and county code analyses that do not have incoming movers. Thus, only a small number of observations could be studied due to the instrument having missing values for a large amount of observations.

4.1 Instrumental Variable Approach

As stated above, we use an instrumental variable approach to answer our research questions. Our instrumental variable approach is based on Brown et al.´s (2008) paper on peer effects in stock market participation. Using willingness to take risks as dependent variable and average risk attitude within a community as explanatory variable, we run an instrumental variable regression with clustered standard errors on the individual level to account for potential within-individual error correlation.[14] The Hausman test gives justification for using a fixed effects approach. Since our sample is restricted to natives, the individual fixed effects also control for time-invariant community characteristics.

The risk attitude in a person's origin state is potentially highly correlated with the current risk attitude due to long-lasting effects of one's origin state. However, since we restrict our sample of western community to natives, there is little reason to suspect that it will be correlated with a native individual's risk attitude except through its effect on one´s neighbors. For instance, if one has lived in Frankfurt one´s entire life and one´s neighbor is from Brandenburg, it is reasonable to think that the level of risk attitude in Brandenburg may be correlated with that neighbor´s risk attitude, but there is no reason to think that the level of risk attitude in Brandenburg should affect one´s own risk attitude unless word-of-mouth effects are at play (see Brown et al., 2008). We therefore instrument for the average risk attitude within a community with the average risk attitude of the origin states of non-native neighbors described above. The one-year lagged instrument looks the following way:

$$Instrument_{r,t-1} = \frac{\sum_m WTRoriginstate_{m,t-1}}{M},$$

with $m \in \{1,2,3,\dots,M\}$ representing all incoming movers (i.e., the individuals emigrated from East Germany) to a region r. For each individual in our model, that we introduce later in this section, we assign the corresponding region in which he or she lives. For our purpose, the one-year lagged average WTR of non-native neighbors' origin states serves as an instrument so that WTR within a community can be treated exogenously in the second-stage regression of the two stage least squares (2SLS) estimation.

[14] Clustered standard errors account for possible correlations within a cluster and asymptotically equal unclustered standard errors. Since we cannot rule out that clustered standard errors are necessary, we include them to err on the side of caution.

In the first stage, we regress the average WTR of a native individual's community on the average WTR in the origin state of this community's former GDR citizens. This instrument allows us to estimate the WTR in the community in a first step in order to treat this variable exogenously in the second stage of our instrumental variable approach. We are thus able to rule out sorting effects meaning that individuals potentially are more likely to move into communities where individuals have similar preferences. We also add all exogenous controls from the second-stage regression for factors that have been shown to impact the WTR as well as individual fixed effects α_i and year fixed effects δ_t. Accordingly, we have the following first-stage regression model with the instrument average WTR of non-native community members' origin states (one-year lagged):

$$(E1)\ WTR_{r,t} = \pi_0 + \pi_1 * Instrument_{r,t-1} + \pi_2 * Sociability_{i,t} + \pi_3 * X_{controls_{r,t}} + \pi_4 * X_{controls_{i,t}} + \alpha_i + \delta_t + \epsilon_{i,t},$$

with $i \in \{1,2,3,\dots,N\}$ and $t \in \{1,2,3,\dots,T\}$ where N = number of individuals and T = number of years. Note that r is the region in which individual i lives. $WTR_{r,t}$ denotes the average willingness to take risks in the western federal state r in year t. In the following, $WTR_{i,t}$ denotes our outcome variable – individual i's willingness to take risks in year t. Our set of control variables is denoted by $X_{controls_{i,t}}$ for time-varying individual controls and $X_{controls_{r,t}}$ for time-varying community controls, which will be presented in Section 4.2. $\epsilon_{i,t}$ represents the error term.

In the second stage, we regress individual WTR on the estimated WTR in the community. For our purpose, we use individual's level of sociability and interact it with average willingness to take risks in the community and additionally include both single variables. We run a year and individual fixed effects model with clustered standard errors. Again, by restricting our sample to natives, individual fixed effects also control for time-invariant community characteristics. We receive the following second-stage regression:

$$(E2)\ WTR_{i,t} = \beta_0 + \beta_1 * \widehat{WTR}_{r,t} + \beta_2 * Sociability_{i,t} + \beta_3 * \widehat{WTR}_{r,t} * Sociability_{i,t} + \beta_4 * X_{controls_{r,t}} + \beta_5 * X_{controls_{i,t}} + \alpha_i + \delta_t + \epsilon_{i,t},$$

with $i \in \{1,2,3,\dots,N\}$ and $t \in \{1,2,3,\dots,T\}$ where N = number of individuals and T = number of years. The results of our instrumental variable approach are shown in Section 5. In the following, we introduce our set of control variables $X_{controls_{i,t}}$ and $X_{controls_{r,t}}$.

4.2 Control Variables

The survey data include a variety of socio-demographic indicators that can be controlled for and that have been found to be associated with risk preferences in previous studies. In the present analysis, we use data for the years 2004, 2006, 2008, 2009, 2010, 2011, 2012, 2013, 2014, and 2015.[15] As individual fixed effects control for unvarying characteristics, we, for instance, do not have to account for individuals' sex.

The data include the control variables inflation-adjusted income[16], educational attainment, occupation level, type of employment, home ownership, family status as well as the dummy variables German nationality and living in an urban area[17]. In addition, we account for the number of children per household that qualify for child allowance, age, age squared as well as the dummy variable living in one of the five largest German cities (*plz_majorcities*) to differentiate between city dwellers and provincials.[18] Family status, for instance, is found to be associated with the level of risk attitude of individuals (see, e.g., Halek and Eisenhauer, 2001; Browne et al., 2017). Furthermore, it has been repeatedly shown that married individuals are more risk averse (see, e.g., Cohn et al., 1975; Riley and Chow, 1992; Lin, 2009). We include individuals' marital status to account for family structure by differentiating between single, married, widowed and divorced persons. The omitted category is single.

We differentiate between blue-collar employees, white-collar employees, civil servants and self-employed individuals to incorporate individuals' occupational status in our analysis. In addition, we control for trainees[19] and retirees, as well as for individuals without any gainful employment. We distinguish between those having no profession despite being able and willing to work, which we refer to as unemployed individuals, and those who do not want to work in the wage economy, such as housewives. The latter category refers to people having "no job". The omitted category in our analysis is blue-collar workers.

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[15] Risk preferences were not surveyed before 2004 and in 2005 and 2007. Data for 2004, however, is not part of the regression but used to derive lagged variables.

[16] Inflation-adjusted income is defined as the natural logarithm of monthly real after tax household income adjusted for inflation.

[17] The dummy variable "living in an urban area" is 1 if a person lives in an urban area and 0 if a person lives in a rural area (definition according to the German Federal Office for Building and Regional Planning).

[18] Berlin, Hamburg, Munich, Cologne and Frankfurt are the largest German cities in terms of population size in 2015.

[19] In corporation with the state governments, German companies have extensive trainee programs where school graduates enroll in a two-year to three-year trainee program. Several weeks of instruction in a public specialized school are followed by several weeks of training on the job.

To account for individuals' level of educational attainment, we control for individuals who received an "Abitur". An Abitur is the highest certificate awarded to high school graduates.[20] Other school-leaving certificates awarded to graduates, such as a medium school degree ("Realschulabschluss") or low school degree ("Hauptschulabschluss"), do not qualify one for university enrollment. We use the regular school level as a reference category.[21]

Regarding control variables on the community level, we account for the share of former East Germans in western communities as well as for the average income. Furthermore, we use the share of German citizens, the share of the population living in urban areas and the share of unemployed people in the communities as time-varying community characteristics.

4.3 Summary Statistics

Table 1 presents the descriptive statistics of the variables used in our analysis. The statistics are reported for the group of West German natives.[22]

Variables	Definition	mean	sd	min	max
WTR	individual's willingness to take risks; (0): risk-averse - (10): risk-prone	4.274	2.343	0	10
WTR_community	average WTR in a given western federal state and year (including all inhabitants – natives and former East Germans)	4.293	0.335	3.385	5.409
Sociability	individual's sociability index consisting of the variables *attend church*; *visit neighbors and friends*; *participate in local politics*; *attend cinema, pop and jazz concerts*; *hours spent on hobbies*; *perform volunteer work*; *attend cultural events*; (0): never - (14): very sociable	7.983	2.673	0	14
Instrument	instrumental variable: average WTR of non-native community members´ origin states in a given western federal state and year	3.766	0.920	1.680	5.048
plz_majorcities*	(1): individual lives in one of the five largest German cities (i.e., Berlin, Hamburg, Munich, Cologne or Frankfurt)	0.234	0.423	0	1
german_nationality*	(1): individual is German citizen	0.899	0.301	0	1

[20] Students who graduate with the Abitur are allowed to enroll at a university in Germany. An Abitur is comparable to A-levels in the U.K. and the baccalauréat in France.

[21] The main difference between the lowest and the medium school degree in Germany is related to the fact that most white-collar positions require a medium school degree, whereas certain blue-collar workers only need to have the lowest school degree.

[22] Natives are the focus of our analysis, while information on former East Germans is used to 1) construct the average risk tolerance in a western federal state and to 2) construct the instrument.

urban*	(1): individual lives in an urban area	0.754	0.430	0	1
married*	(1): individual is married	0.675	0.469	0	1
widowed*	(1): individual is widowed	0.084	0.277	0	1
divorced*	(1): individual had a divorce	0.081	0.273	0	1
number_children	number of children in household that qualify for child allowance	0.658	0.958	0	6
propertyownership*	(1): individual owns real estate	0.627	0.484	0	1
ln_real_aftertaxincome	natural logarithm of monthly real after tax household income adjusted for inflation	7.887	0.575	0	10.343
highlevelschool*	(1): individual has a high level school-leaving certificate	0.212	0.409	0	1
lowlevelschool*	(1): individual has a low level school-leaving certificate	0.495	0.500	0	1
age	age of individual	54.380	15.797	17	94
age_squared	age squared	3100.251	1743.423	289	9409
civilservant*	(1): individual is a civil servant	0.043	0.204	0	1
nojob*	(1): individual has no job	0.068	0.251	0	1
trainee*	(1): individual is a trainee	0.028	0.165	0	1
whitecollar*	(1): individual is a white-collar worker	0.300	0.458	0	1
unemployed*	(1): individual is registered as unemployed	0.034	0.182	0	1
retired*	(1): individual is retired	0.321	0.467	0	1
selfemployed*	(1): individual is self-employed	0.048	0.214	0	1
share_EastInWest	share of former East Germans in a given western federal state and year	0.014	0.011	0.003	0.133
share_GermanNationality	share of German citizens in a given western federal state and year	0.899	0.032	0.829	1
mean_income	average natural logarithm of monthly real after tax household income adjusted for inflation in a given western federal state and year	7.887	0.046	7.475	7.956
share_unemployed	share of unemployed people in a given western federal state and year	0.036	0.013	0.015	0.182
share_urban	share of people living in urban areas in a given western federal state and year	0.747	0.220	0.413	1

Table 1: Summary statistics for all variables used in our analyses, 2006 and 2008-2015. 2004 data is missing as we use lagged variables. * indicator variables. *Bluecollar*, *mediumlevelschool* and *single* are used as omitted categories. *Source:* SOEP v32.1, 2004-2015.

5 Results

This section reports and discusses our empirical findings. Table 2 shows the OLS regression results for an approach that does not account for an instrumental variable.

OLS regression results - dependent variable: WTR

	(1)	(2)	(3)
WTR_community	1.002***	0.635***	0.635***
	(0.041)	(0.155)	(0.156)
Sociability		-0.094	-0.087
		(0.069)	(0.069)
WTR_community*sociability		0.031*	0.029*
		(0.016)	(0.016)
Constant	-0.028	1.250*	13.985**
	(0.177)	(0.693)	(7.120)
Individual fixed effects	YES	YES	YES
Year fixed effects	NO	YES	YES
Control variables	NO	NO	YES
Adj. R-Squared	0.532	0.533	0.534
Number of observations	17,980	17,980	17,980
Number of individuals	2,226	2,226	2,226

Notes: A community is defined as West German federal state. Only native individuals are considered. Standard errors are clustered on the individual level and presented in parentheses. *** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level. *Source:* SOEP v32.1, 2004-2015.

Table 2: OLS regression results without an instrumental variable

The effect of average risk attitude in the West German community on the native individual is significant at the 1% level and positive throughout all three models. Model 1 only includes individual fixed effects, Model 2 adds year fixed effects and Model 3 additional control variables presented in Section 4.2. The coefficient estimate is very similar between Model 2 and 3, but much greater in Model 1. Year fixed effects seem to be relevant which is not surprising given that the observation period spans the global financial crisis.

As discussed before, there might be a reverse causality problem causing endogeneity. We implement an instrumental variable approach to address this. Table 3 summarizes the results from the first-stage regression. In this first stage of our instrumental approach, a high correlation between the instrumental variable and the average WTR within the community can be identified. More precisely, the one-year lagged average WTR of non-native neighbors' origin states serves as an instrument so that WTR within a community can be treated exogenously in the second stage.

First-stage regression (2SLS estimation); dependent variable: WTR_community

	(1)	(2)	(3)
Instrument: WTR of non-native community members´ origin states (one-year lagged)	0.355***	0.426***	0.462***
	(0.003)	(0.011)	(0.010)
Constant	2.958***	3.057***	2.858***
	(0.012)	(0.040)	(0.791)
Individual fixed effects	YES	YES	YES
Year fixed effects	NO	YES	YES
Control variables	NO	NO	YES
F-statistic of instrument (p-value)	11,851.29 (0.000)	1,602.37 (0.000)	1,977.55 (0.000)
Adj. R-Squared	0.095	0.850	0.855
Number of observations	17,980	17,980	17,980
Number of individuals	2,226	2,226	2,226

Notes: A community is defined as West German federal state. Only native individuals are considered. *WTR_community* is instrumented for with the one-year lagged average WTR of non-native community members´ origin states. Standard errors are clustered on the individual level and presented in parentheses. *** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level. *Source:* SOEP v32.1, 2004-2015.

Table 3: First-stage regression results (2SLS estimation)

Model 1 estimates the impact of the instrument without any controls and year fixed effects. We find the instrument to be highly significant, with a coefficient estimate of 0.355. Model 2 adds year fixed effects to the analysis, which can be important as we investigate the WTR during times of the global financial crisis as well as the European sovereign debt crisis. Year fixed effects control for the interdependencies between WTR and economic and financial conditions, which have been shown to be important.[23] Again, we find our instrument to be significant at the 1% level and the coefficient estimate equals 0.426. Model 3 adds additional control variables. We find the results highly comparable to Model 2 in terms of significance levels and coefficient estimates, which should be interpreted as an indicator of robustness of our empirical findings. To sum up, the estimates for our instrument are highly robust and we therefore conclude that the instrument is an adequate measure of community's risk preferences for our second stage estimation. This allows us to treat community willingness to take risks exogenously in the second stage.

Table 4 summarizes the results from the second-stage regression. In this main part of our analysis, we find strong empirical evidence for peer effects in risk preferences. Therefore, Hypothesis 1 can be confirmed.

[23] See Coudert and Gex (2008).

Second-stage regression (2SLS estimation); dependent variable: WTR

	(1)	(2)	(3)	(4)
WTR_community	0.822***	0.885***	0.921***	0.810***
	(0.114)	(0.276)	(0.293)	(0.304)
Sociability	-0.075	-0.065	0.038***	-0.055
	(0.055)	(0.055)	(0.010)	(0.056)
WTR_community*sociability	0.024*	0.024*		0.022*
	(0.013)	(0.013)		(0.013)
Constant	0.509	0.098	13.430*	13.822*
	(0.494)	(1.294)	(7.233)	(7.264)
Individual fixed effects	YES	YES	YES	YES
Year fixed effects	NO	YES	YES	YES
Control variables	NO	NO	YES	YES
Adj. R-Squared	0.531	0.531	0.531	0.532
Number of observations	17,980	17,980	17,980	17,980
Number of individuals	2,226	2,226	2,226	2,226

Notes: A community is defined as West German federal state. Only native individuals are considered. *WTR_community* is instrumented for with the one-year lagged average WTR of non-native community members´ origin states. Standard errors are clustered on the individual level and presented in parentheses. *** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level. *Source:* SOEP v32.1, 2004-2015.

Table 4: Second-stage regression results (2SLS estimation)

A major insight is that the instrumented WTR is significant at the 1% level in all four models that are used for analysis. As indicated by the fourth column in Table 4, a 1 point increase in WTR within community leads to an increase of the individual WTR in this community by 0.810 points. Interestingly, the East-West migration after the fall of the Berlin wall implies changes in the WTR of the West German native population, even decades after the German reunification. However, we cannot confirm peer effects to be stronger for more sociable individuals as the positive coefficient is found to be significant only at the 10% level throughout all three models that include the interaction term.[24] Evidence is inconclusive with respect to Hypothesis 2.

Table 5 shows the second-stage regression results for the full sample (i.e., column (4)) from Table 4, while columns (5) and (6) refer to a sub-sample of male and female individuals, respectively.

[24] When we use clustered standard errors on the state level, we obtain similar magnitudes of peer effects and the interaction term. Note that the interaction term becomes significant at the 5% level. However, we prefer the more cautious approach with higher standard errors and a higher number of clusters. See Cameron and Miller (2016) for details.

Second-stage regression (2SLS estimation); dependent variable: WTR

	Full Sample (4)	Males (5)	Females (6)
WTR_community	0.810***	0.473	1.150***
	(0.304)	(0.423)	(0.439)
Sociability	-0.055	-0.091	-0.003
	(0.056)	(0.075)	(0.081)
WTR_community*sociability	0.022*	0.031*	0.009
	(0.013)	(0.017)	(0.019)
Constant	13.822*	24.903**	4.484
	(7.264)	(10.997)	(9.573)
Individual fixed effects	YES	YES	YES
Year fixed effects	YES	YES	YES
Control variables	YES	YES	YES
Adj. R-squared	0.532	0.514	0.518
Number of observations	17,980	8,658	9,322
Number of individuals	2,226	1,068	1,158

Notes: A community is defined as West German federal state. Only native individuals are considered. *WTR_community* is instrumented for with the one-year lagged average WTR of non-native community members´ origin states. Standard errors are clustered on the individual level and presented in parentheses. *** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level. *Source:* SOEP v32.1, 2004-2015.

Table 5: Second-stage regression results for males and females (2SLS estimation)

We find that peer effects in risk preferences are particularly relevant for female individuals. For male individuals, the magnitude of peer effects is smaller (by more than 2 times) and notsignificant.[25] Hence, Hypothesis 3, which states an equal impact of peer groups on males' and females' risk preferences, is rejected. Instead, we conclude that peer effects in risk preferences are stronger for females than for males. Our results are contrary to Balsa et al. (2015), who find evidence of peer effects in risk aversion for male individuals by estimating peer effects in risk aversion in a sample of adolescent high school students in Uruguay using lottery choices. The authors do not find robust results with respect to females. While the authors investigate gender differences experimentally and focus on adolescents, we test them empirically using data on a representative sample of the German population, which may explain the difference.

[25] Note that for both sub-analyses, we find the instrument to be significant in the first stage.

6 Conclusion

An increasing body of research documents peer effects in several domains of economic decision-making, where individuals´ decisions may be driven by others' choices and their social norms rather than following individually rational expected utility maximization. These models of social preferences focus on relative payoff concerns and a preference to conform to others. They can be interpreted as rational behavior in the sense that social conformity may improve long-term utility. Peer groups, therefore, should have an influence on decision-making under risk and willingness to take risk. Furthermore, peer effects seem to be important in order to understand individuals' and group behavior, as well.

Exploring peer effects in risk attitudes is highly relevant for understanding the stability of individual risk preferences. Our paper contributes to the understanding of peer effects in risk attitudes by providing causal inference of large-scale community peer effects in a representative measure of the German population. We investigate the impact of average WTR in a federal state on an individual's WTR living in this federal state. While the impact of peer groups on risk aversion has already been studied experimentally for particular subgroups, we estimate peer effects in risk preferences using a large representative panel dataset for the German population.

We find strong empirical evidence for peer effects in risk preferences in this population. A major insight is that the instrumented WTR is significant at the 1% level in all models that are used for analysis. Peer effects in risk preferences are particularly pronounced for female individuals. Furthermore, peer effects are found to be stronger for individuals with higher social interaction; however, this result is significant only at the 10% level.

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Appendix

A.1 Results for Covariates

OLS regression results - dependent variable: WTR

	(1)	(2)	(3)
WTR_community	1.002***	0.635***	0.635***
	(0.041)	(0.155)	(0.156)
Sociability		-0.094	-0.087
		(0.069)	(0.069)
WTR_community*sociability		0.031**	0.029*
		(0.016)	(0.016)
plz_majorcities			0.084
			(0.444)
german_nationality			-0.703***
			(0.271)
urban			-0.172
			(0.354)
married			-0.335***
			(0.120)
widowed			-0.654***
			(0.208)
divorced			-0.162
			(0.152)
number_children			-0.013
			(0.026)
propertyownership			0.082
			(0.076)
ln_real_aftertaxincome			0.037
			(0.061)
highlevelschool			0.256
			(0.265)
lowlevelschool			0.751*
			(0.417)
age			-0.030
			(0.024)
age_squared			0.661*
			(0.345)
civilservant			-0.369*
			(0.212)
nojob			0.120
			(0.105)
trainee			-0.074
			(0.129)
whitecollar			-0.047
			(0.080)
unemployed			-0.120
			(0.114)

retired			-0.045
			(0.110)
selfemployed			0.113
			(0.150)
share_EastInWest			-1.857
			(7.584)
share_GermanNationality			-1.615
			(1.478)
mean_income			-1.185
			(0.855)
share_unemployed			-0.782
			(1.877)
share_urban			-1.448
			(1.488)
year2008		0.038	0.002
		(0.063)	(0.062)
year2009		-0.117	-0.180
		(0.116)	(0.112)
year2010		-0.051	-0.093
		(0.081)	(0.077)
year2011		-0.037	-0.105
		(0.065)	(0.066)
year2012		0.055	-0.006
		(0.056)	(0.059)
year2013		0.045	-0.019
		(0.081)	(0.073)
year2014		-0.023	-0.060
		(0.064)	(0.058)
year2015		-0.001	-
		(0.062)	
Constant	-0.028	1.250*	13.985**
	(0.177)	(0.693)	(7.120)
Individual fixed effects	YES	YES	YES
Year fixed effects	NO	NO	YES
Control variables	NO	NO	YES
Adj. R-Squared	0.532	0.533	0.534
Number of observations	17,980	17,980	17,980
Number of individuals	2,226	2,226	2,226

Notes: A community is defined as West German federal state. Only native individuals are considered. Standard errors are clustered on the individual level and presented in parentheses. *** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level. *Source:* SOEP v32.1, 2004-2015.

Table A1: OLS regression results without an instrumental variable

First-stage regression (2SLS estimation); dependent variable: WTR_community

	(1)	(2)	(3)
Instrument: WTR of non-native community members´ origin states (one-year lagged)	0.355*** (0.003)	0.426*** (0.011)	0.462*** (0.010)
Sociability			0.001 (0.001)
plz_majorcities			0.021 (0.024)
german_nationality			-0.024 (0.026)
urban			-0.002 (0.023)
married			-0.019* (0.010)
widowed			-0.005 (0.017)
divorced			-0.023 (0.015)
number_children			-0.004** (0.002)
propertyownership			-0.002 (0.007)
ln_real_aftertaxincome			-0.003 (0.005)
highlevelschool			-0.045 (0.037)
lowlevelschool			-0.027 (0.041)
age			-0.028*** (0.002)
age_squared			0.066* (0.034)
civilservant			0.009 (0.016)
nojob			0.001 (0.009)
trainee			0.010 (0.011)
whitecollar			0.002 (0.006)
unemployed			0.000 (0.009)
retired			-0.006 (0.009)
selfemployed			-0.016 (0.012)
share_EastInWest			-10.066*** (1.764)

share_GermanNationality			-0.571***
			(0.202)
mean_income			0.282***
			(0.095)
share_unemployed			-1.349***
			(0.229)
share_urban			-0.095
			(0.125)
year2008		-0.440***	-0.417***
		(0.005)	(0.006)
year2009		-0.985***	-0.920***
		(0.004)	(0.006)
year2010		-0.323***	-0.225***
		(0.008)	(0.009)
year2011		-0.284***	-0.177***
		(0.004)	(0.005)
year2012		-0.136***	-0.002
		(0.004)	(0.006)
year2013		-0.570***	-0.397***
		(0.006)	(0.006)
year2014		-0.278***	-0.088***
		(0.005)	(0.003)
year2015		-0.221***	-
		(0.006)	
Constant	2.958***	3.057***	2.858***
	(0.012)	(0.040)	(0.791)
Individual fixed effects	YES	YES	YES
Year fixed effects	NO	YES	YES
Control variables	NO	NO	YES
F-statistic of instrument (p-value)	11,851.29 (0.000)	1,602.37 (0.000)	1,977.55 (0.000)
Adj. R-Squared	0.095	0.850	0.855
Number of observations	17,980	17,980	17,980
Number of individuals	2,226	2,226	2,226

Notes: A community is defined as West German federal state. Only native individuals are considered. *WTR_community* is instrumented for with the one-year lagged average WTR of non-native community members´ origin states. Standard errors are clustered on the individual level and presented in parentheses. *** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level. *Source:* SOEP v32.1, 2004-2015.

Table A2: First-stage regression results (2SLS estimation)

Second-stage regression (2SLS estimation); dependent variable: WTR

	(1)	(2)	(3)	(4)	(5) Males	(6) Females
WTR_community	0.822***	0.885***	0.921***	0.810***	0.473	1.150***
	(0.114)	(0.276)	(0.293)	(0.304)	(0.423)	(0.439)
Sociability	-0.075	-0.065	0.038***	-0.055	-0.091	-0.003
	(0.055)	(0.055)	(0.010)	(0.056)	(0.075)	(0.081)
WTR_community*sociability	0.024*	0.024*		0.022*	0.031*	0.009
	(0.013)	(0.013)		(0.013)	(0.017)	(0.019)
plz_majorcities			0.079	0.082	-0.321	0.990
			(0.446)	(0.448)	(0.379)	(1.027)
german_nationality			-0.703***	-0.713***	-0.723*	-0.694*
			(0.272)	(0.274)	(0.273)	(0.375)
urban			-0.169	-0.169	-0.158	-0.250
			(0.351)	(0.354)	(0.269)	(0.638)
married			-0.339***	-0.332***	-0.364**	-0.304*
			(0.120)	(0.121)	(0.162)	(0.184)
widowed			-0.655***	-0.648***	-0.596	-0.654**
			(0.208)	(0.209)	(0.382)	(0.267)
divorced			-0.165	-0.159	-0.104	-0.193
			(0.152)	(0.153)	(0.223)	(0.216)
number_children			-0.013	-0.012	0.005	-0.030
			(0.027)	(0.027)	(0.038)	(0.038)
propertyownership			0.081	0.079	0.015	0.153
			(0.075)	(0.075)	(0.107)	(0.106)
ln_real_aftertaxincome			0.036	0.037	0.095	-0.016
			(0.062)	(0.061)	(0.084)	(0.085)
highlevelschool			0.254	0.245	0.488	0.123
			(0.275)	(0.276)	(0.358)	(0.356)
lowlevelschool			0.755*	0.748*	1.076	0.525
			(0.426)	(0.425)	(0.776)	(0.458)
age			-0.029	-0.023	-0.036	-0.019
			(0.025)	(0.026)	(0.037)	(0.035)
age_squared			0.648*	0.593*	0.878*	0.473
			(0.349)	(0.349)	(0.508)	(0.478)

civilservant		-0.366*	-0.373*	-0.150	-0.652**
		(0.214)	(0.213)	(0.317)	(0.273)
nojob		0.120	0.122	-0.037	0.044
		(0.104)	(0.105)	(0.236)	(0.126)
trainee		-0.072	-0.072	-0.051	-0.162
		(0.128)	(0.128)	(0.188)	(0.179)
whitecollar		-0.048	-0.047	0.049	-0.158
		(0.081)	(0.081)	(0.112)	(0.116)
unemployed		-0.121	-0.122	0.040	-0.348**
		(0.114)	(0.114)	(0.158)	(0.162)
retired		-0.043	-0.039	0.016	-0.111
		(0.110)	(0.110)	(0.167)	(0.145)
selfemployed		0.116	0.114	0.274	-0.085
		(0.150)	(0.150)	(0.208)	(0.219)
share_EastInWest		-1.505	-1.514	-8.383	4.539
		(7.954)	(7.959)	(12.784)	(9.421)
share_GermanNationality		-1.578	-1.719	-1.085	-2.341
		(1.530)	(1.538)	(2.110)	(2.250)
mean_income		-1.282	-1.287	-2.463*	-0.313
		(0.859)	(0.862)	(1.317)	(1.118)
share_unemployed		-0.837	-0.664	1.228	-2.189
		(1.894)	(1.892)	(2.701)	(2.626)
share_urban		-1.451	-1.492	-2.631	-0.495
		(1.522)	(1.521)	(2.227)	(2.081)
year2008	0.103	0.007	0.031	-0.040	0.094
	(0.105)	(0.102)	(0.102)	(0.149)	(0.140)
year2009	0.082	-0.142	-0.077	-0.418	0.234
	(0.280)	(0.285)	(0.286)	(0.410)	(0.402)
year2010	0.061	-0.075	-0.042	-0.092	0.004
	(0.166)	(0.156)	(0.156)	(0.226)	(0.216)
year2011	0.039	-0.098	-0.080	-0.217	0.044
	(0.117)	(0.100)	(0.099)	(0.142)	(0.139)
year2012	0.095	-0.008	-0.005	-0.007	-0.005
	(0.075)	(0.061)	(0.061)	(0.089)	(0.084)
year2013	0.154	-0.000	0.021	-0.019	0.057
	(0.162)	(0.125)	(0.125)	(0.179)	(0.175)

year2014		0.044	-0.057	-0.048	-0.065	-0.034
		(0.107)	(0.071)	(0.070)	(0.101)	(0.099)
year2015		0.047	-	-	-	-
		(0.087)				
Constant	0.509	0.098	13.430*	13.822*	24.903**	4.484
	(0.494)	(1.294)	(7.233)	(7.264)	(10.997)	(9.573)
Individual fixed effects	YES	YES	YES	YES	YES	YES
Year fixed effects	NO	YES	YES	YES	YES	YES
Control variables	NO	NO	YES	YES	YES	YES
Adj. R-Squared	0.531	0.531	0.531	0.532	0.514	0.518
Number of observations	17,980	17,980	17,980	17,980	8,658	9,322
Number of individuals	2,226	2,226	2,226	2,226	1,068	1,158

Notes: A community is defined as West German federal state. Only native individuals are considered. *WTR_community* is instrumented for with the one-year lagged average WTR of non-native community members´ origin states. Standard errors are clustered on the individual level and presented in parentheses. *** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level. *Source:* SOEP v32.1, 2004-2015.

Table A3: Second-stage regression results for full sample (1-4) and a sub-sample of males (5) and females (6) (2SLS estimation)